

Title of the abstract

Metrological hydrogen fuel research supporting standardisation needs

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Abstract

Introduction

The Project « Metrology for sustainable hydrogen energy applications » of the *European Metrology Programme for Innovation and Research* supports the standardisation process through normative metrology research in the hydrogen fuel sector that meets the requirements of the European Directive 2014/94/EU.

Aim

The overall objective is to address the standardisation needs by feeding the revision of two ISO standards that are currently too generic to enable a sustainable implementation of hydrogen.

The hydrogen purity dispensed at refueling points does not comply with the technical specifications of ISO 14687-2 for fuel cell electric vehicles. The rapid progress of the fuel cell technology requires now revising this standard towards less constraining limits. While ensuring the specifications, optimized validated analytical methods are proposed to reduce the number of analyses.

Traceable methods to assess accurately the hydrogen mass absorbed and stored in metal hydrides will be developed and validated; this is a research axis for the revision of the ISO 16111 standard to develop this safe storage technique for hydrogen.

Methods

The probability of hydrogen impurity presence affecting fuel cells and analytical techniques for traceable measurements of hydrogen impurities will be assessed.

Novel validated methods for measuring the hydrogen mass absorbed in hydrides tanks AB, AB2 and AB5 types referenced to ISO 16111 will be proposed as the methods currently available do not provide accurate results.

Results

Improved hydrogen quality specifications for fuel cell vehicles and analytical techniques to enable traceable measurements of hydrogen impurities will be proposed. New data on maximum concentrations of individual impurities based on degradation studies will be determined. A determination system for hydrogen mass measurements in different hydride tanks will be developed and validated.

Conclusion

The outputs will have a direct impact on the standardisation works for ISO 16111 and ISO 14687-2 revisions in the relevant working groups of ISO/TC 197 "Hydrogen technologies".

References

ISO 16111 Developing Transportable gas storage devices - Hydrogen absorbed in reversible metal hydride, 2008

ISO 14687-2 Hydrogen Fuel - Product Specification - Part 2: Proton exchange membrane (PEM) fuel cell applications for road vehicles, 2012

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